

# ***DYNABOX XL***

Right angle  
Servo gearheads  
For heavy duty applications



Backlash down to 0,5 arc minute

Torque up to  
8000 Nm



# ***DYNABOX XL***



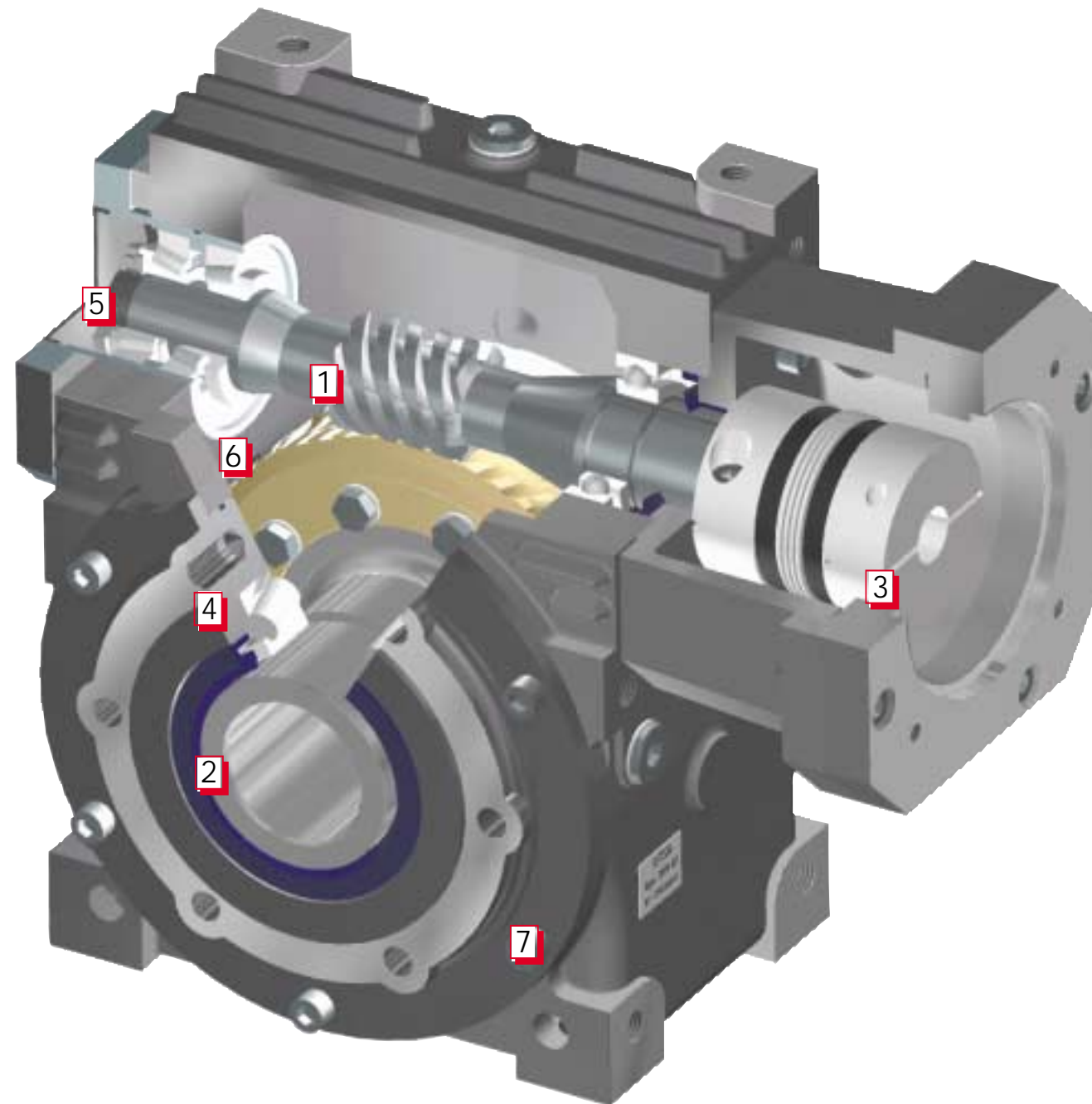
GIRARD TRANSMISSIONS introduces :

# DYNABOX XL

with 2 precision levels :

**EXPERT** : backlash < 0,5 arcminute  
(adjustable)

**MEDIUM** : backlash < 5 arcminutes  
(fixed)



- 1 Computer optimized gear contact pattern : less stress, longer life.
- 2 Keyless connection : reliable and backlash free connection with shrink disc.
- 3 Universal servo-kit : including high torsional stiffness coupling + flange.
- 4 Oversized taper roller bearings : provide very high permissible loads.
- 5 Constant input bearings preload design : 2 taper roller bearings + 1 floating ball bearings allowing temperature variations with same preload : higher input permissible speeds, longer life.
- 6 Centrifugally cast wheel ring : superior shock and wear resistance.
- 7 Cast iron housing

## 2 MOUNTING OPTIONS



Hollow shaft



Single output shaft

## DYNABOX XL benefits

Low backlash

Space saving configuration : the right-angle design, more compact, is favourable in most cases.

Wormgear : very silent, more important permissible overloads, higher torsional stiffness.

Maintenance free : life-lubricated unit with high performances synthetic lubricant.

# DYNABOX XL SELECTION

## START/STOP SERVICE S5

Calculate torque S5 on gearbox output :

$$\text{Torque S5} = T_{\max} \times F1 \times F2$$

GEARBOX RUNNING TIME DURING 1 CYCLE				
	10 %	30 %	50 %	60 %
F1	0,7	0,85	1	1,15

over 60 %, go to CONTINUOUS SERVICE selection

NUMBER OF CYCLES/HOUR					
	1000	2000	3000	5000	10000
F2	1	1,35	1,45	1,6	1,9

Pre-select the gearbox size :  
in the column Torque S5, at N<sub>max</sub> input speed

## CONTINUOUS SERVICE S1

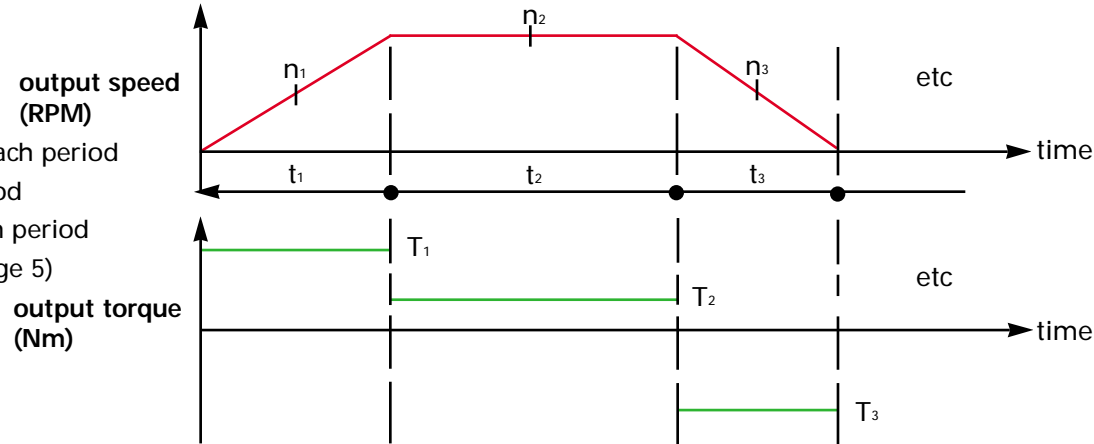
Calculate torque S1 on gearbox output :

$$\text{Torque S1} = T_{\max}$$

Pre-select the gearbox size :  
in the column Torque S1, at N<sub>max</sub> input speed

Calculate the power P<sub>th</sub> lost during cycle :

n<sub>1,2,3</sub> : average output speed of each period  
T<sub>1,2,3</sub> : output torque of each period  
η<sub>1,2,3</sub> : average efficiency of each period  
(to be calculated from page 5)  
t<sub>1,2,3</sub> : duration of each period



$$P_{th} = 0,105 \times \sqrt[3]{\frac{t_1 \left( \frac{100 - \eta_1}{\eta_1} \times n_1 T_1 \right)^3 + t_2 \left( \frac{100 - \eta_2}{\eta_2} \times n_2 T_2 \right)^3 + t_3 \left( \frac{100 - \eta_3}{\eta_3} \times n_3 T_3 \right)^3 + \dots}{t_1 + t_2 + t_3 + \dots}}$$

P<sub>th</sub> must be lower than the thermal capacity of the pre-selected gearbox size, otherwise select a larger gearbox.

Thermal capacities :	DYNABOX XL 125	1652W
	DYNABOX XL 160	2479W
	DYNABOX XL 200	4210W

### LEGEND

T<sub>max</sub> (Nm) : maximum output torque during operating cycle / continuous operation.  
N<sub>max</sub> (RPM) : maximum input speed achieved during operating cycle.  
E-stop (Nm) : gearbox output emergency torque (2 seconds maximum duration, maximum of 25000 times).  
i : exact gear ratio.  
ig (kgxcm<sup>2</sup>) : polar moment of inertia on input, without coupling (see coupling inertia page 10).  
η (%) : gearbox efficiency.  
Fr (N) : maximum radial load applicable at the middle of the output shaft, without any axial load.  
Fa (N) : maximum axial load applicable on output shaft, without any radial load.

# TECHNICAL SPECIFICATIONS

N <sub>max</sub>	i	6000			4000			3000			2000			1000			E-stop	ig	Rever. class	Fr	Fa
		Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η	Torque S1	Torque S5	η						
DYNABOX XL 125	5,125:1	792	97	609	1005	96	716	1181	96	884	1459	95	1217	2008	94	3767	50	1	13600	12000	
	7,2:1	840	97	632	1043	96	742	1224	95	907	1497	95	1208	1993	93	3767	38	1	15000	15000	
	10,25:1	832	96	622	1026	95	725	1196	95	887	1464	94	1147	1893	92	3767	30,5	1	16700	18000	
	15,25:1	726	94	542	894	93	625	1031	92	759	1252	91	972	1604	89	3342	25	1	18900	22000	
	20,5:1	1026	93	759	1252	92	877	1447	91	1043	1721	89	1320	2178	87	3767	23,4	1	20600	22000	
	29,5:1	869	90	634	1046	88	731	1206	87	861	1421	85	1079	1780	81	3295	23,15	2	22900	22000	
	45:1	1142	86	833	1374	84	952	1571	82	1104	1822	80	1369	2259	75	3767	21	3	26000	22000	
	60:1	980	82	713	1176	79	815	1345	77	929	1533	74	1150	1898	69	2937	20	3	28000	22000	
	90:1	825	74	598	987	71	680	1122	68	779	1285	64	960	1584	58	2502	19	3	32000	22000	

DYNABOX XL 160	5,125:1	1450	97	1128	1861	97	1324	2185	96	1648	2719	96	2334	3851	94	7251	120	1	17800	15000
	7,2:1	1411	97	1092	1802	96	1266	2089	96	1569	2589	95	2151	3549	94	7251	77	1	19700	19000
	10,25:1	1513	96	1161	1916	96	1346	2221	95	1650	2723	94	2215	3655	93	7251	63	1	21900	24000
	15,25:1	1333	95	1030	1700	94	1177	1942	93	1443	2381	92	1896	3128	90	5572	52,7	1	24700	29000
	20,5:1	1775	94	1338	2208	93	1530	2525	92	1856	3062	90	2392	3947	88	7251	51,5	1	27000	34000
	29,5:1	1492	91	1111	1833	89	1264	2086	88	1535	2533	86	1945	3209	83	6571	52,8	2	30000	34000
	45:1	2219	87	1630	2690	85	1858	3066	84	2211	3648	81	2765	4562	77	7251	46,5	3	34100	34000
	60:1	1740	83	1272	2099	81	1439	2374	79	1723	2843	76	2127	3510	71	6331	40	3	37200	34000
	90:1	1552	76	1123	1853	73	1261	2081	70	1489	2457	67	1842	3039	60	4933	38	3	42000	34000

DYNABOX XL 200	5,125:1	2592	98	2008	3313	97	2392	3947	97	2954	4874	96	4208	6943	95	12826	287	1	37000	37500
	7,2:1	2721	97	2108	3478	97	2462	4062	96	3042	5019	96	4236	6989	94	12826	177	1	41000	44500
	10,25:1	2691	97	2071	3417	96	2408	3973	96	2946	4861	95	4007	6612	93	12826	143	1	46000	52600
	15,25:1	2346	95	1813	2991	94	2083	3437	94	2540	4191	93	3376	5570	91	12448	102	1	51800	63000
	20,5:1	3356	94	2551	4209	93	2909	4800	92	3538	5838	91	4590	7574	89	12826	96	1	56600	71000
	29,5:1	2841	92	2117	3493	90	2410	3977	89	2925	4826	87	3738	6168	84	12277	99	2	63000	71000
	45:1	3747	88	2775	4579	86	3154	5204	85	3788	6250	83	4747	7833	78	12826	82,5	3	71700	71000
	60:1	3170	85	2325	3836	82	2636	4349	80	3159	5212	77	3928	6481	72	11674	71	3	78000	71000
	90:1	2714	78	1985	3275	75	2228	3676	72	2641	4358	69	3316	5471	62	9323	69	3	88000	71000

## REVERSIBILITY CLASSES

Reversibility means the gearbox capability to be back-driven. When selecting an irreversible gearbox, make sure that

during deceleration, load inertia does not create overloads exceeding the maximum permissible torque.

1	Totally reversible
2	Uncertainly reversible
3	Irreversible

## NOTES CONCERNING EFFICIENCY

Efficiency values may be achieved after a minimum of 24 hours at full load operation (running-in-period). Efficiency values are achieved only when gearbox operates at

nominal torque. For gearbox operating under nominal torque, efficiency is lower.